WHAT IS CLAIMED IS:

1. A method in a wireless communication system comprising at least one transmitter provided with at least one antenna and at least one receiving unit provided with at least one antenna and wherein training sequences are transmitted from the at least one antenna of the at least one transmitter to the at least one antenna of the at least one mobile unit, characterized in that

first, prior to the transmission, a training sequence P(k) is Inverse Discrete Fourier Transformed to a sequence p(n);

second, for each antenna branch the Inverse Discrete Fourier Transformed sequence p(n) is cyclically rotated by a number of predetermined steps being different for each antenna branch;

third, the cyclically rotated training sequences $p(n-n_1)$, $p(n-n_2)$ are transmitted concurrently from different antennas to the receiving unit; and

fourth, at the receiving unit, the received sequences being a superposition of transmitted training sequences, each individually affected by the propagation medium, are used to provide channel impulse response estimates for the transmission from respective antenna.

2. A method in a wireless communication system comprising at least one transmitter provided with at least two antennas and at least one receiving unit provided with at least one antenna and wherein training sequences are transmitted from the at least two antennas of the at least one

transmitter to the at least one antenna of the at least one mobile unit, characterized in that

first, prior to the transmission, a training sequence P(k) is Inverse Discrete Fourier Transformed to a sequence p(n);

second, for each antenna branch the Inverse Discrete Fourier Transformed sequence p(n) is cyclically rotated by a number of predetermined steps being different for each antenna branch;

third, the cyclically rotated training sequences $p(n-n_1)$, $p(n-n_2)$ are transmitted concurrently from different antennas to the receiving unit; and

fourth, at the receiving unit, the received sequences being a superposition of transmitted training sequences, each individually affected by the propagation medium, are used to provide channel impulse response estimates for the transmission from respective antenna.

3. A method according to claim 2, characterized in that instead of an Inverse Discrete Fourier Transform, an Inverse Fast Fourier Transform is performed.

4. A method according to claim 2, characterized in that a cyclic extension having a predetermined length is added to each sequence prior the transmission, the cyclic extension being greater than the delay spread.

5. A method according to claim 2, characterized in that the distance between each step is greater than the delay spread.

6. A method according to claim 2, characterized in that at the receiving unit the received sequence

in a first step, is Discrete Fourier Transformed and divided by the training sequence P(k),

in a second step, the result from the first step is Inverse Discrete Fourier Transformed resulting in a sequence having distinctly separated regions in the time domain, the separated regions containing the respective channel impulse response estimates.

7. A method according to claim 3, characterized in that at the receiving unit the received sequence

in a first step, is Fast Fourier Transformed and divided by the training sequence P(k),

in a second step, the result from the first step is Inverse Fast Fourier Transformed resulting in a sequence having distinctly separated regions in the time domain, the separated regions containing the respective channel impulse response estimates.

8. A method according to claim 6, characterized in that

fixed predetermined ranges are selected in the discrete time domain;

each range comprising one and only one of the above defined regions; and

one channel impulse response is selected from each of said ranges.

9. A method according to claim 8, characterized in that in each range, only the strongest positions are used, and the

others are set to zero, and, for each selected channel impulse response, positions outside the range are replaced by zeros.

10. A method according to claim 8, characterized in that each resulting channel impulse response is converted to the frequency domain by a DFT or FFT operation depending on operating methods of primarily equalizer and FEC decoder.

11. A method according to claim 6, characterized in that a window function is applied prior to the second step, wherein leakage inherent in the preceding transformation in the first step is reduced.

12. A method according to claim 6, characterized in that a filter function is applied after the second step, wherein leakage inherent in the preceding transformation in the first step is reduced.

13. A method according to claim 11, characterized in that said window function is a Hanning window or said filter Inversion is an IDFT transformed Hanning window.

14. A method according to claim 8, characterized in that an inverse impulse response corresponding to the window function is applied after the selection of said channel impulse response, wherein the phase and amplitude values are compensated due to the result from the preceding window.

15. A method according to claim 8, characterized in that an inverse function is applied after the conversion to the

frequency domain by a DFT or FFT operation, wherein the phase and amplitude values are compensated due to the result from the preceding window.

16. A wireless communication system comprising at least one transmitter provided with at least two antennas and at least one receiving unit provided with at least one antenna and wherein training sequences are transmitted from the at least two antennas of the at least one transmitter to the at least one antenna of the at least one receiver unit, characterized in that

first, prior to the transmission, a training sequence $P(k)$ is Inverse Discrete Fourier Transformed to a sequence $p(n)$;

second, for each antenna branch the Inverse Discrete Fourier Transformed sequence $p(n)$ is cyclically rotated by a number of predetermined steps (n_1, n_2), being different for each antenna branch;

third, the cyclically rotated training sequences $p(n-n_1)$, $p(n-n_2)$ are transmitted concurrently from different antennas to the receiving unit; and

fourth, at the receiving unit, the received sequences being a superposition of transmitter training sequences each individually affected by the propagation medium, are used to provide channel impulse response estimates for the transmission from respective antenna.

17. A system according to claim 16, characterized in that instead of an Inverse Discrete Fourier Transform, an Inverse Fast Fourier Transform is performed.

18. A system according to claim 16, characterized in that a cyclic extension having a predetermined length is added to each sequence prior the transmission, the cyclic extension being greater than the delay spread.

19. A system according to claim 16, characterized in that the distance between each step is greater than the delay spread.

20. A system according to claim 16, characterized in that at the receiving unit the received sequence

in a first step, is Discrete Fourier Transformed and divided by the training sequence P(k); and

in a second step, the result from the first step is Inverse Discrete Fourier Transformed resulting in a sequence having distinctly separated regions in the time domain, the separated regions containing the respective channel impulse response estimates.

21. A system according to claim 17, characterized in that at the receiving unit the received sequence

in a first step, is Fast Fourier Transformed and divided by the training sequence P(k);

in a second step, the result from the first step is Inverse Fast Fourier Transformed resulting in a sequence having distinctly separated regions in the time domain, the separated regions containing the respective channel impulse response estimates.

22. A system according to claim 20, characterized in that

fixed predetermined ranges are selected in the discrete time domain;

each range comprising one and only one of the above defined regions; and

one channel impulse response is selected from each of said ranges.

23. A system according to claim 22, characterized in that in each range, only the strongest positions are used, and the others are set to zero for each selected channel impulse response positions outside the range are replaced by zeros.

24. An arrangement in a wireless communication system comprising at least one transmitter provided with at least two antennas and at least one receiving unit provided with at least one antenna and wherein

training sequences are transmitted from the at least two antennas of the at least one transmitter to the at least one antenna of the at least one receiver unit, characterized by

means for performing, prior to the transmission, an Inverse Discrete Fourier Transformation on a training sequence P(k) to produce a sequence p(n);

means for performing, for each antenna branch, a cyclic rotation by a predetermined number of steps of the Inverse Discrete Fourier Transformed sequence, said steps being different for each antenna branch;

means for transmitting concurrently the cyclically rotated training sequences $p(n-n_1)$, $p(n-n_2)$ from different antennas to the receiving unit; and

means for using, at the receiving unit, the received sequences, being a superposition of transmitted training sequences each individually affected by the propagation medium, to provide channel impulse response estimates for the transmission from respective antenna.

25. An arrangement according to claim 23, characterized in that instead of a Inverse Discrete Fourier Transform, an Inverse Fast Fourier Transform is performed.

26. An arrangement according to claim 24, characterized by means for adding a cyclic extension having a predetermined length to each sequence prior to the transmission, the cyclic extension being greater than the delay spread.

27. An arrangement according to claim 24, characterized in that the distance between each step is greater than the delay spread.

28. An arrangement according to claim 24, characterized in that the receiving unit comprises means for

performing, in a first step, a Discrete Fourier Transform and a division of the received sequence by the training sequence $P(k)$; and

performing, in a second step, an Inverse Discrete Fourier Transform of the result from the first step resulting in a sequence having distinctly separated regions in the time

domain, the separated regions containing the respective channel impulse response estimates.

29. An arrangement according to claim 25, characterized in that the receiving unit comprises means for

performing, in a first step, a Fast Fourier Transform and a division of the received sequence by the training sequence P(k); and

performing, in a second step, an Inverse Fast Fourier Transform of the result of the first step resulting in a sequence having distinctly separated regions in the time domain, the separated regions containing the respective channel impulse response estimates.

30. An arrangement according to claim 28, characterized in that the receiving unit comprises

means for selecting fixed predetermined ranges in the discrete time domain, each range comprising one and only one of the above defined regions; and

means for selecting one channel impulse response from each of said ranges.

31. An arrangement according to claim 30, characterized in that in each range, only the strongest positions are used, and the others are set to zero for each selected channel impulse response position outside the range are replaced by zero.

32. A wireless communication system comprising at least one transmitter provided with at least two antennas and at least one

receiving unit provided with at least one antenna and wherein training sequences are transmitted from the at least two antennas of the at least one transmitter to the at least one antenna of the at least one receiver unit, characterized in that

first, prior to the transmission, a training sequence $P(k)$ is Inverse Fast Fourier Transformed to a sequence $p(n)$;

second, for each antenna branch the Inverse Fast Fourier Transformed sequence $p(n)$ is cyclically rotated by a number of predetermined steps (n_1, n_2), being different for each antenna branch;

third, the cyclically rotated training sequences $p(n-n_1)$, $p(n-n_2)$ are transmitted concurrently from different antennas to the receiving unit; and

fourth, at the receiving unit, the received sequences $s(n-n_1)$, $s(n-n_2)$ being a superposition of transmitter training sequences each individually affected by the propagation medium, are used to provide channel impulse response estimates for the transmission from respective antenna.

33. An arrangement in a wireless communication system comprising at least one transmitter provided with at least two antennas and at least one receiving unit provided with at least one antenna and wherein

training sequences are transmitted from the at least two antennas of the at least one transmitter to the at least one antenna of the at least one receiver unit, characterized by

means for performing, prior to the transmission, an Inverse Fast Fourier Transformation on a training sequence $P(k)$ to produce a sequence $p(n)$;

means for performing, for each antenna branch, a cyclic rotation by a predetermined number of steps of the Inverse Fast Fourier Transformed sequence, said steps being different for each antenna branch;

means for transmitting concurrently the cyclically rotated training sequences $p(n-n_1)$, $p(n-n_2)$ from different antennas to the receiving unit; and

means for using, at the receiving unit, the received sequences, being a superposition of transmitted training sequences each individually affected by the propagation medium, to provide channel impulse response estimates for the transmission from respective antenna.